Catalyst 5000 Series

This chapter provides information on the Catalyst 5000 series switching system. The information is organized into the following sections:

- Product Overview
- Standard Features
- Product Numbers
- Configuration Worksheet

Note Documentation for the Catalyst 5000 series is available in two forms: on a CD-ROM called Cisco Connection Documentation, Enterprise Series (formerly called UniverCD) and printed books. You can request a free copy of the documentation CD when you place an order and have the option of subscribing to a CD update service. A user guide ships with each switch.

You can also access Cisco technical documentation on the World Wide Web URL http://www.cisco.com. For more information, see the chapter "Documentation" at the end of the catalog.

Product Overview

The Catalyst 5000 series is a modular switching system that provides high-density switched Ethernet and Fast Ethernet interfaces for wiring closet and data-center applications. The Catalyst 5000 series system provides virtual LAN networking and optional multilayer switching with Cisco Internetwork Operating System (Cisco IOS) software functionality. The modular design allows you to dedicate 10-Mbps Ethernet and 100-Mbps Fast Ethernet connections to existing LAN segments or high-performance workstations and servers using unshielded twisted-pair (UTP), shielded twisted-pair (STP), and fiber-optic cable. The switch architecture includes a single integrated 1.2 gigabits-per-second data switching backbone that supports wire-speed switched Ethernet and Fast Ethernet users across a wide range of backbone interfaces including Fast Ethernet, Fiber Distributed Data Interface (FDDI), and ATM.

The five-slot, modular chassis of the Catalyst 5000 series features fault-tolerant power with a dual power supply option and a full complement of hot-swappable interface modules. (Hot-swappable means that all system components can be removed, added, or changed without rebooting or taking the system off line.) The five module slots support the required Supervisor Engine and, in the remaining four slots, any of the following interface modules:

- 24 interfaces—10BaseT (10-Mbps Ethernet)
- 48 interfaces—10BaseT (10-Mbps Ethernet) Group Switching Ethernet Module
- 12 interfaces—10BaseFL (10-Mbps Ethernet)
- 12 interfaces—100BaseTX (100-Mbps Fast Ethernet)
- 12 interfaces—Auto-negotiating 10/100BaseTX (100-Mbps Fast Ethernet)
- 12 interfaces—100BaseFX (100-Mbps Fast Ethernet)
- One dual attachment station—100-Mbps CDDI/FDDI
- One interface—155-Mbps ATM (limit of three modules only)

The new 10BaseT 48-port Group Switching Ethernet Module provides a method to divide users into managed switch groups. Group switching combines hub costing and network management on one module; it is an alternative to shared-media hubs. Each module has four 10BaseT Ethernet segments with groups of 12 users per segment (48 interfaces per module). The Group Switching Ethernet Module provides connection to 48 10-Mbps (10BaseT) full- or half-duplex Ethernet interfaces using four RJ-21 Telco female ports (12 interfaces per port). You can switch each group of 12 ports to any Catalyst 5000 VLAN.

The Supervisor Engine enables Layer 2 switching and network management. This module contains two Fast Ethernet interfaces to connect to workstations, servers, other switches, and routers. The Catalyst 5000 series system can accommodate up to 96 switched Ethernet interfaces and up to 50 Fast Ethernet interfaces. The 10/100BaseTX module supports auto-negotiation, which sets the appropriate speed and duplex mode (half or full) for the switched connection and adapter interface. This variety of interface modules offers the flexibility to accommodate today's dynamic network topologies and the scalability to meet bandwidth, speed, and application advancements today and in the future.

The Catalyst 5000 series system has a number of features that contribute to its superior traffic management capabilities. The switch is fully nonblocking for 10-Mbps Ethernet and is capable of switching over 1 million packets per second. Ethernet to Ethernet, Fast Ethernet, or ATM packet latency is less than 10 microseconds. Ethernet to FDDI packet latency is 100 microseconds. The data switching bus supports three priority queues so that the user can define priorities on a per-port basis.

The Catalyst 5000 series system supports the formation of workgroups within and between other Catalyst 5000 series switches. One thousand VLANs can be maintained across switching and routing platforms through Fast Ethernet, CDDI/FDDI, and ATM connections. Any Fast Ethernet interface on the Catalyst 5000 series system can be configured as an InterSwitch Link (ISL) to support multiple VLANs. Note that all VLANs support the IEEE 802.1d spanning-tree algorithm for fault-tolerant connections. ATM supports VLANs by emulating the LANs into virtual circuits. FDDI will support 802.10 for multiple VLANs.

The switch can be configured through a command-line interface or a GUI-based management application. The command-line interface can be accessed out-of-band by an ASCII terminal or modem and in-band using Telnet or SNMP commands through any LAN or ATM interface. CiscoWorks network management integration with the CiscoView application can be used to query the Catalyst 5000 series system physical view as well as configure, monitor, and troubleshoot the system. The VlanDirector management application allows users to perform drag-and-drop configuration of their network based on logical user groups and display or enterprise-wide logical view of these groups.

Standard Features

The Catalyst 5000 series base system includes the following standard features:

- Five-slot system chassis, which includes a single power supply
- Supervisor Engine:
  - High-performance, low latency 1.2-Gbps switching backplane with tri-level priority
  - Hardware-based support for static entries and self-learning of the 16,000 active MAC addresses and associated VLANs in the bridge lookup table
  - 25-MHz 68EC040 network management processor
  - Two Fast Ethernet interfaces (full or half-duplex), which can be ISL trunks
  - Fully integrated support for 1000 VLANs
  - Console port (female DCE EIA/TIA-232)
  - 8-MB DRAM
  - 4-MB Flash EPROM for downloadable microcode and software upgrades
  - 256-KB NVRAM
  - 192-KB packet buffer per interface
  - Self-diagnostics at startup and runtime
  - Environmental monitoring
- AC power supply
- Power cord
- Rack-mounting hardware
- Cable management system
- Optional second AC power supply:
  - Extends individual power supply by load sharing
  - Allows users to complement dual sources of prime power (each supply has its own power cord)

Figure 111 Catalyst 5000 Series Front Panel

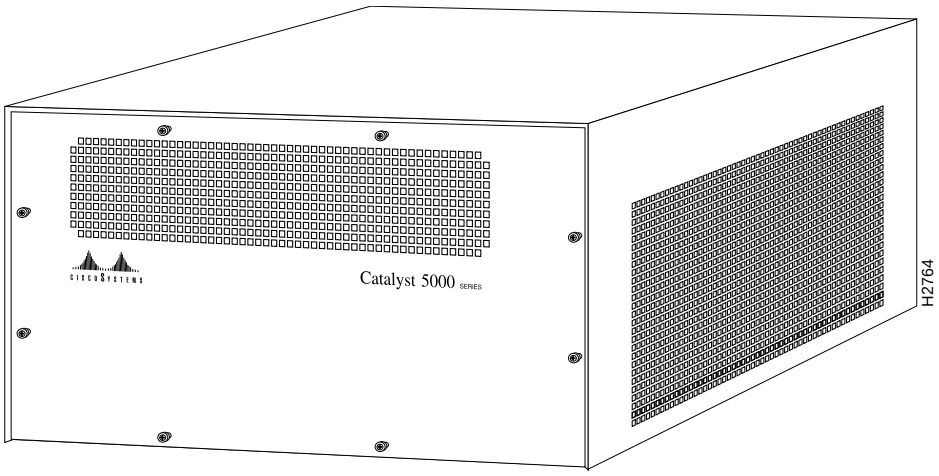


Figure 112 Catalyst 5000 Series Rear Panel

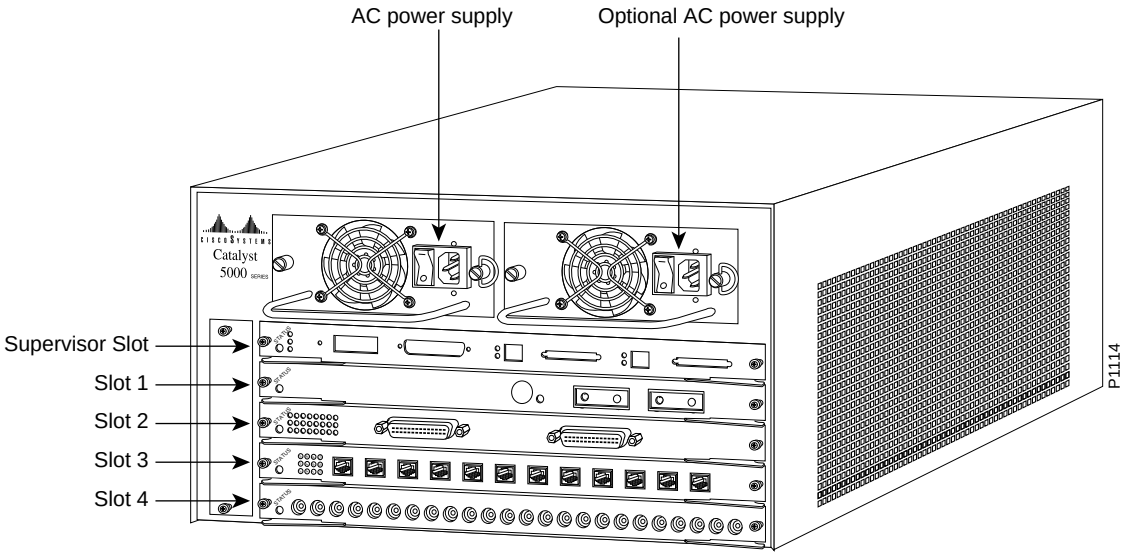


Table 251 Catalyst 5000 Series Summary of Features

Characteristics	Description
Placement	Rack-mounted, front or back (standard 19-inch rack)
Switching backplane	1.2-Gbps, supports over 1 million packets per second (pps)
Memory	4-MB Flash memory 8-MB DRAM 256-KB NVRAM 512-KB EPROM
Interfaces	Supervisor console: DB-25 (female) Supervisor 100BaseTX: RJ-45 (female), MII [1](female) 10BaseT: RJ-21 (female, Telco) 10BaseFL: ST (female) 100BaseTX: RJ-45 (female) 10/100BaseTX: R5-45 (female) 100BaseFX: SC CDDI: RJ-45 (female) FDDI: MIC, ST Optical bypass switch: 6-pin mini-DIN ATM:RJ-45, MM (SC), SM (SC)
Duplex	10-Mbps Ethernet: Full or half duplex 100-Mbps Fast Ethernet: Full or half duplex 10/100-Mbps Fast Ethernet: Auto-negotiated speed and duplex FDDI: Half duplex ATM: Full duplex
Network management	Cisco Discovery Protocol SNMP agent v1 (RFC 1155-1157) SNMP MIB II (RFC 1213) Ethernet MIB (RFC 1398) Interface Table (RFC 1573) Bridge MIB (1493) FDDI MIB (RFC 1512) SMT 7.3 (RFC 1285) AToMIC MIB (RFC 1695) (future) ILMI MIB (ATM Forum UNI 3.0) (future) Cisco Workgroup MIB
Maximum station-to-station cabling distance	10BaseT Ethernet: Category 5 UTP: 328' (100 m) 10BaseFL Ethernet: 62.5/125-micron fiber: 1.24 miles (2 km) 100BaseTX Fast Ethernet: Category 5 UTP: 328' (100 m) 10/100BaseTX Fast Ethernet: Category 5 UTP: 328' (100 m) 100BaseFX Fast Ethernet: 62/125 multimode fiber (400 m half duplex, 2 km full duplex) CDDI: Category 5 UTP: 328' (100 m) FDDI: 62.5/125 multimode fiber, 2 km 8.7/125 singlemode fiber, 10 km ATM LAN emulation module UTP: Category 5 UTP: 328' (100 m) ATM LAN emulation module multimode fiber: 62.75/125 micron fiber, 2 km ATM LAN emulation module single mode fiber: 8.7/125 micron fiber 10 km

Characteristics	Description
ATM LAN emulation module optical specifications	Multimode fiber: Transmitter output power: –19 to –14 dBm Receiver sensitivity: –32.5 to –14 dBm Wavelength: 1270 to 1380 nm Optical source: LED Maximum span: 2 km Single mode fiber: Transmitter output power: –4 to –8 dBm Receiver sensitivity: –32.5 to –8 dBm Wavelength: 1261 to 1360 nm Optical source: LASER Maximum span: 10 km
Agency approvals	FCC Class A (47 CFR Part 15) EN 55022A Class B on shielded UTP VCCI Class 2 on shielded UTP UL 1950 CSA-C22.2 No. 950 93 EN 60950 CE Mark
LEDs	Status LED on each module shows successful completion, minor and major failure of power-up diagnostics Link Good LED shows status of any interface Switch Load LEDs show backplane utilization
Dimensions (H x W x D)	10.4 x 17.21 x 18.14" (26.2 x 42.5 x 44.5 cm)

1. MII = Media-independent interface.

Table 252 Catalyst 5000 Series Environmental Specifications

Description	Specification
Weight	Minimum: 43 lb (19.5 kg) Maximum: 88 lb (39 kg) Average shipping: 60 lb (27.2 kg)
AC input voltage	8.0 Amps @ 100 VAC 60 Hz 4.0 Amps @ 200VAC 50 Hz Power consumption: 376W Heat dissipation: 562.5W, 1919.83 Btu/hour, KVA = .8

Product Numbers

This section describes the product numbers associated with the Catalyst 5000 series. If a Cisco product number ends with an equal sign (=), the item can be ordered only as a spare. If a product number does not end with an equal sign, the item can be ordered as a spare or as a configurable part of a system order. When you order a product as a spare, remember to include the equal sign.

Table 253 Catalyst 5000 Series Product Numbers

Description	Product Number
Base system (chassis, Supervisor Engine, one power supply)	WS-C5001
Optional power supply	WS-C5008
Chassis and one power supply (spare)	WS-C5007=
Power supply (spare)	WS-C5008=
Supervisor Engine (spare)	WS-X5009=
Ethernet switching module (10BaseT)	WS-X5010
Group Ethernet switching module (10BaseT)	WS-X5020
Ethernet switching module (10BaseFL)	WS-X5011
Fast Ethernet switching module (100BaseTX)	WS-X5113
Fast Ethernet switching module (10/100BaseTX, auto-negotiation)	WS-X5213
Fast Ethernet switching module (100BaseFX)	WS-X5111
CDDI module (UTP)	WS-X5103
FDDI module (multimode)	WS-X5101
FDDI module (single mode)	WS-X5104
ATM LAN emulation module, UTP	WS-X5153
ATM LAN emulation module, multimode[1]	WS-X5155
ATM LAN emulation module, single mode	WS-X5154
SMARTnet	CON-SNT-WS-C5001
Documentation	See the chapter “Documentation” at the end of the catalog

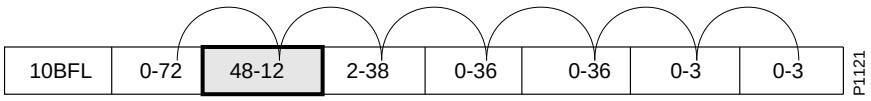
1. For cable and connector information, see the section “ATM Cable Specifications” in the chapter “Cables and Transceivers.”

Configuration Worksheet

The Catalyst 5000 series system has many options. Use the Catalyst 5000 series Configuration Worksheet that follows to help you plan your order or to upgrade an existing system. One blank worksheet is provided, and you can make extra copies as needed.

The worksheet provides a chart to help you calculate maximum configurations. To use the chart, first select your primary interface choice from the left column (10BaseT, 10BaseFL,10/100BaseTX, 100BaseTX, or 100BaseFX). Then read across to determine configuration options. The bold boxes denote the maximum number of ports available for your primary interface choice.

For example, if you select 10BaseFL in the left column, the chart shows that the system can support a maximum of 48 to a minimum of 12 10BaseFL ports. If you choose the lowest end of the range (12 10BaseFL ports), you can look at the other columns of the same row to see how many of each of the other interface you can add. Notice that you have room left for 72 10BaseT ports, 38 100BaseTX ports, 36 10/100BaseTX ports, 36 100BaseFX ports, 3 ATM ports, or 3 FDDI ports, as follows:



On the other hand, if you choose the highest end of the range (48 10BaseFL ports), you have room left for 0 10BaseT ports, 2 100BaseTX ports, 0 10/100BaseTX ports, 0 100BaseFX ports, 0 ATM ports, or 0 FDDI ports. Note that the number range in the shaded boxes lists the highest number of ports first; this is to clarify the relationship to the number range in the other boxes, which range from low to high. As the number of your primary interface ports increases, the number of available ports on the other interface decreases.

Catalyst 5000 Series Configuration Worksheet

Circle your choices:

Chassis: Catalyst 5000
Standard power supply: Mandatory
Optional dual power supply: WS-C5008
Rack-mounting hardware: Standard

AC Power cord: U.S. (CAB-7KAC)—standard if not specified; Italy (CAB-7KACI); U.K. (CAB-7KACU); Australia (CAB-7KACA); Europe (CAB-7KACE)

Switching and Backbone Modules (Maximum One Per Slot)	**Product Number**	**Slot 1**	**Slot 2**	**Slot 3**	**Slot 4**	**Slot 5**
Catalyst 5000 5-slot chassis, Supervisor Engine (occupies Slot 1), and one AC power supply	WS-C5001	X				
Catalyst 5000 Ethernet switching module (10BaseT)	WS-X5010					
Catalyst 5000 group switching Ethernet module	WS-X5020					
Catalyst 5000 Ethernet switching module (10BaseFL)	WS-X5011					
Catalyst 5000 Fast Ethernet switching module (100BaseTX)	WS-X5113					
Catalyst 5000 Fast Ethernet switching module (10/100BaseTX)	WS-X5213					
Catalyst 5000 Fast Ethernet switching module (100BaseFX)	WS-X5111					
Catalyst 5000 FDDI module (multimode)	WS-X5101					
Catalyst 5000 FDDI module (single mode)	WS-X5104					
Catalyst 5000 CDDI module (UTP)	WS-X5103					
Catalyst 5000 ATM LAN emulation module (multimode)*	WS-X5155					
Catalyst 5000 ATM LAN emulation module (single mode)*	WS-X5154					
Catalyst 5000 ATM LAN emulation module (UTP)*	WS-X5153					
Optional AC power supply (installed in chassis)	WS-C5008					

SMARTnet	CON-SNT-WS-C5001
Catalyst 5000 spare chassis and one power supply	WS-C5007=
Catalyst 5000 spare power supply	WS-C5008=
Catalyst 5000 spare Supervisor Engine	WS-C5009=

Maximum Configuration:

	10BT	10BFL	100BTX	10/100BTX	100BFX	ATM	FDDI
10BT	192-24	0-36	2-38	0-36	0-36	0-3	0-3
10BFL	0-72	48-12	2-38	0-36	0-36	0-3	0-3
100BTX	0-96	0-48	50-2	0-48	0-48	0-3	0-4
10/100BTX	0-96	0-36	2-38	48-12	0-36	0-3	0-3
100BFX	0-72	0-36	2-38	0-36	48-12	0-3	0-3

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* Limit of 3 modules